CONDUCTING COMPREHENSIVE CONTACT & SOURCE CASE INVESTIGATIONS

GUIDELINE for ESTABLISHING EFFECTIVE POLICIES, PROCEDURES & PRACTICES

For Contact and Source Case Investigations upon Identification Or Suspicion of a Case of

ACTIVE TUBERCULOSIS DISEASE

This guideline has been developed by the Wisconsin Department of Health and Family Services as a tool to assist local health departments in the development of policies, procedures and practices for the care of clients with tuberculosis. This model needs to be adapted according to each local health department's needs. Items that provide additional information, education or reference are in italics or are otherwise highlighted, such as in boxes. These portions are included for educational purposes, are not written in policy and procedure language and are not needed in the local health department's final policy and procedure document.

Because it is not possible for any guideline to address all potential situations for individuals, clinical judgement must always be exercised. All other legal requirements must be followed to ensure "due process" and all laws pertaining to minors and/or persons with guardians are to be followed when implementing these guidelines.

When federal regulations, state statutes, administrative rules, or CDC endorsed guidelines pertaining to tuberculosis are revised, the Division of Public Health will notify local health departments of the availability of these resources. Local health departments need to update their policies, procedures and practices accordingly to remain consistent with ongoing changes in legal requirements and tuberculosis care, for both the health of the affected individuals and the health of the general public.

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GUIDELINE for ESTABLISHING EFFECTIVE PRACTICE	Reviewed/Revised:
Conducting Comprehensive Contact & Source Case Investigations upon Identification or Suspicion of a Case of Active TUBERCULOSIS Disease.	Signatures & dates: _____ _____ _____ _____ _____ _____ _____ _____ _____ _____
_____Health Department Original Effective Date _____ Approved by _____	

GUIDELINE for POLICY DEVELOPMENT

I. Terms and Definitions:

Aggregate Report for Tuberculosis Program Evaluation - ARPE - A standard report form used to report activities related to contact investigation, targeted testing and treatment of latent TB infection to CDC.

Case Reporting – Informing the state or local health department when a new case or occurrence of TB disease has been diagnosed or is suspected according to the requirements of Wisconsin Administrative Rule, HFS 145.03 and HFS 145.04.

Transmission is affected by factors such as the time spent sharing air, the environmental conditions and other factors, such as the vulnerability of the contact. All Close Contacts and High-Risk contacts are also part of the broader classification of "contacts". A "contact" may also be a person who has shared air with a person with infectious TB, but not to the extent that they are considered Close Contacts or High-Risk Contacts, as defined below:

Classification of Contacts:

- **Contact –** A person who shares air with a person who has infectious TB.

- **Close Contact –** An individual who has shared air with a person with infectious TB and is at high risk of developing infection with *M. tuberculosis* because of the length, time or frequency of their exposure; i.e., close, prolonged contact.

- **High-Risk Contact** – A contact in any environment who is at increased risk of progression from TB infection to TB disease and/or is likely to suffer increased morbidity or mortality from TB disease because of his/her vulnerability, even if the length of time or circumstances of the exposure are not judged to meet the criteria of "close".

- **"Other Than Close" Contact –** An individual with less intense or less frequent contact to the index patient than the close contacts, causing them to be at less risk of developing infection with *M. tuberculosis* because of less time and intensity of exposure. All contacts have risk; the greater risk is for Close Contacts and High-Risk Contacts.

Conducting Comprehensive Contact and Source Case Investigations

- **Previously Infected Contact –** A person who has previously tested positive for TB infection who is now a contact of a person with active tuberculosis.

- **Non-contact –** A person who has probably not shared air with the index case but is named or tested during the contact investigation, usually due to request, i.e., a worried person who was probably not exposed.

Child – For TB testing purposes, the definition of a child is someone age four years and under, i.e. up until the 5th birthday.

Any person who is not an adult with a healthy immune system is at greater risk for tuberculosis. Therefore the testing, diagnosis and treatment of children and adolescents is highly specialized and should be conducted with the medical advice of a physician specialized in the diagnosis and treatment of children. The most recently published edition of the American Academy of Pediatrics Report of the Committee on Infectious Diseases, The Red Book, should be used as reference.

Clinically Evaluated – Medical exam that may include a skin test, a chest radiograph, review of TB signs and symptoms and collection of clinical specimens when appropriate.

Concentric Circle – A standard method of investigation used in TB control which permits the investigator to examine contacts in sequence beginning with those contacts at highest risk for infection.

Contact Investigation – The process of identifying, examining, evaluating and establishing treatment for all persons who are at risk of TB infection or TB disease due to recent exposure to infectious or suspected tuberculosis. This process includes interviewing people who have spent time with a person with infectious tuberculosis disease, and skin testing them to see if they have become infected.

Conversion – An increase in skin test reaction size of 10 mm or more within a period of two years; indicative of a recent infection with *M. tuberculosis.*

Culture Confirmed Tuberculosis – Tuberculosis disease that has been confirmed by culture-positive identification on a clinical specimen.

Exposure – The condition of being subjected to something (e.g., infectious agents) that could have a harmful effect. A person exposed to *M. tuberculosis* does not necessarily become infected.

Extrapulmonary tuberculosis – Tuberculosis in any part of the body other than the lungs.

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Field Investigation – Visiting a TB patient's home, workplace or other locations where the person spent time while infectious; considered an essential component of a contact investigation.

High-risk tuberculosis – an infection with tuberculosis that is highly likely to progress to active disease and may easily become infectious if it remains untreated.

Immunosuppression – The suppression of natural human responses to infection as caused by disease, malnutrition, or medical treatment involving drugs or irradiation.

Index Case – A suspected or confirmed case of pulmonary or laryngeal TB; a person with TB disease who is initially reported to the health department; the first person brought to your attention, usually the focus for a contact investigation.

Infection – The condition in which organisms capable of causing disease enter the body and elicit a response from the host's immune system. TB infection may or may not lead to active TB disease, however persons with infection remain at life-long risk of developing active disease if their infection goes untreated. Also known as latent tuberculosis infection (LTBI).

Infectious tuberculosis – Tuberculosis disease of the respiratory tract, capable of producing infection or disease in others as demonstrated by the presence of acid-fast bacilli in the sputum or bronchial secretions or by chest radiograph and clinical findings.

Laryngeal tuberculosis – Tuberculosis of the larynx; often considered more infectious than pulmonary TB; organisms are generally exhaled by the person with the disease.

Latent TB infection – Infection with *M. tuberculosis*, usually detected by a positive PPD skin test result, in a person who has no symptoms of active TB and is not infectious. Tubercle bacilli are present in the body but the disease is not clinically active; same as tuberculosis infection.

Level of Infection – The percentage of contacts with a similar amount of exposure who have a newly identified positive skin reaction.

Period of Infectiousness – The time period in which a person with TB disease is capable of transmitting tuberculosis; usually indicated by the duration of the patient's symptoms, beginning at least as early as the onset of symptoms.

Positive Skin Test *for a Contact to Active Tuberculosis* – A change in the individual's tuberculin skin test from negative to positive (5mm or greater).

Report of Verified Case of Tuberculosis - RVCT – Standard case report form used to report tuberculosis cases to the CDC.

Second Round Testing – Contact investigation testing done on identified contacts who were skin test negative at the original test. This testing is done 90 days after their last exposure to infectious tuberculosis.

Source Case Investigation – Conducted to find the source of TB transmission to an index case or to a child (age 4 and under) who is found to have a positive TB skin test or is suspected or confirmed as having active TB disease. It is also conducted to find the source of transmission for a cluster of persons who have had skin test conversions.

Suspect tuberculosis – An illness marked by symptoms such as prolonged cough, prolonged fever, hemoptysis; compatible radiographic or medical imaging findings; or laboratory tests that may be indicative of tuberculosis.

Transmission – The spread of an infectious agent from one person to another. The likelihood of transmission is directly related to the duration and intensity of the exposure to *M. tuberculosis* and the vulnerability of the person who has been exposed.

Window Period – The 90 day time span in a contact investigation between final exposure to the infectious tuberculosis case and the repeat skin test for those individuals whose initial skin test was negative.

Window Prophylaxis – Chemopropyhlaxis given to high-risk contacts (including children age four and under) who have a negative skin test reaction at the beginning of the contact investigation.

II. Purpose:

The purpose of this policy is to provide for the comprehensive investigation of contacts of a person with active pulmonary or laryngeal tuberculosis to determine other cases of active disease and/or infection and to foster treatment of these individuals. This includes finding, testing, evaluating and prioritizing contacts and close contacts to determine whether they are infected or have active disease, providing appropriate follow up and treatment and, when possible, identifying the source of tuberculosis disease transmission to the index case under investigation.

III. Persons Affected/Responsible:

This policy will be carried out by _____ under the direction of
(List staff positions affected)
the health officer of the _____ health department.
City/County

IV. SUGGESTED POLICY LANGUAGE:

The _____ Health Department will ensure that a comprehensive contact investigation is conducted at once for every new case of infectious, suspect or confirmed tuberculosis. [Reference: WI Stats. ss. 252.06 (3)]

The health department will also ensure that a source case investigation is conducted when a child, age four years and under, is found to have a positive tuberculin skin test, or is suspected or confirmed as having tuberculosis disease, or a cluster of persons have been found to have skin test conversions.

[*The diagnosis of tuberculosis infection or disease in a child is a sentinel event representing recent transmission of M. tuberculosis in the community. Also note definition of "child" for TB investigation purposes*.]

The Health Department will ensure medical evaluation, treatment, and follow-up of any additional cases of active tuberculosis or latent tuberculosis infection identified in the course of a contact investigation. The Health Department will work collaboratively with medical providers, other public health programs, community based organizations, the State of Wisconsin Tuberculosis Program and other appropriate groups to ensure that a comprehensive epidemiologic investigation is conducted whenever indicated using effective tools and strategies including all necessary measures to ensure confidentiality.

V. Legal Authority:

The local health officer has authority under Wisconsin Statutes, Wis. Stats. ss. 252.07(8) & 252.07(9) and Wisconsin Administrative Code HFS 145.05 (1).

VII. References Used for State Guideline Development

[*The following references were used to develop the model state guideline. Any additional references used by the local health department should also be listed in the final policy and procedure document.*]

1. American Academy of Pediatrics. **Red Book 2000, Report of the Committee on Infectious Disease**, 25th Edition, 2000

2. American Thoracic Society. **Diagnostic Standards and Classification of Tuberculosis in Adults and Children.** April, 2000

3. American Thoracic Society. **Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection**. April, 2000

4. California Department of Health Services and Executive Committee of the California Tuberculosis Controllers Association. **Guidelines for the Placement or Return of Tuberculosis Patients into High Risk Housing, Work, Correctional, or In-Patient Settings**. 1997.

5. California Department of Health Services and Executive Committee of the California Tuberculosis Controllers Association. **Contact Investigation Guidelines 11/12/98**

6. Centers for Disease Control and Prevention. **Core Curriculum on Tuberculosis**; Fourth Edition, 2000.

7. Centers for Disease Control and Prevention. **Improving Patient Adherence to Tuberculosis Treatment**. 1994.

8. National Tuberculosis Controllers Association. **Tuberculosis Nursing: A Comprehensive Guide to Patient Care**, 1997.

9. New Jersey Medical School National Tuberculosis Center, **Tuberculosis Glossary**, 1995

10. North Carolina Division of Epidemiology, Department of Health and Human Services. **North Carolina Tuberculosis Policy Manual**. 1997.

11. Wisconsin Department of Health and Family Services. **Wisconsin Administrative Rule, Control of Communicable Diseases,** Chapter 145.

12. Wisconsin Division of Public Health. **Infection Control Plan for Local Health Departments** (developed as a template for local health departments). 1998.

13. Wisconsin Division of Public Health. **Tuberculosis Infection Control Plan** (developed as a template for county jails). 1998.

14. **Wisconsin Statutes, Communicable Diseases**; ss. 252.06 – 252.07; 1997-98.

15. **Wisconsin TB Program Strategic Plan for Elimination of TB in Wisconsin,** 2001.

16. **World Wide Web addresses**, National Model TB Centers & CDC:

    Harlem Model Center – www.harlemtbcenter.org
    New Jersey Model Center – www.umdnj.edu/ntbc
    San Francisco Model Center – www.nationaltbcenter.edu
    Centers for Disease Control and Prevention, CDC, Atlanta – www.cdc.gov

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II. Purpose:

The purpose of this procedure is to guide staff in carrying out comprehensive contact and source case investigations. Comprehensive contact investigations include ensuring that contacts to active tuberculosis disease are found, evaluated for the presence of TB disease or infection, and that they receive the appropriate follow up care and treatment. Whenever possible, the source case is to be identified in order to halt the transmission of further active disease. This procedure will enable the health department to carry out the activities required by the Contact and Source Case Investigation Policy of the health department.

III. Persons Affected/Responsible:

This procedure will be carried out by _____ under the direction
(List staff positions affected)
of the health officer of the _____ health department.
City/County

IV. SUGGESTED PROCEDURE LANGUAGE

A. Establish Investigation Methods and Priorities

1. Use the concentric circle method as a standard for investigation, ensuring the examination and documentation of contacts in sequence, beginning with those who are at highest risk of transmission or who are the most likely source of disease. [See diagram, section H.]

2. Conduct Contact Investigations and Source Case Investigations using the same concentric circle investigative approach, but focus differently using the following criteria:

   a. Conduct a **Contact Investigation** to:

      - Identify persons who were exposed to infectious TB disease by the index case
      - Evaluate the exposed individuals for TB disease or latent TB infection (LTBI)
      - Provide treatment for those with TB disease or LTBI

   b. Conduct a **Source Case Investigation** to determine:

      - The source of *M. tuberculosis* that has been transmitted to a child, an index case or a cluster of persons who have had skin test conversions
      - Infectiousness of the source case and whether the person is still infecting others

3. Consider each of the *contacts* to the index case as a potential source of TB *transmission* to that person (the index case) when looking for a source case.

4. Implement the following if any new case of active disease is discovered during an investigation:

   a. If the new case has *not* been previously identified and a contact investigation has *not* been done, a new contact investigation is begun for that person.

   b. If the new case has been reported, a contact investigation has been done or is in progress, and treatment and follow up have been established, follow other relevant health department policies, procedures and practices.

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5. Conduct Contact and Source Case Investigations according to the following priorities:

   a. Priority One:

      - Laryngeal disease with positive sputum smear.
      - Pulmonary disease with positive sputum smear.
      - Pulmonary or extrapulmonary disease in children.
      - Pulmonary disease with HIV.

   b. Priority Two:

      - Pulmonary disease with positive sputum smear from bronchial brush, wash or lung tissue biopsy, and unknown sputum culture status.
      - Pulmonary disease diagnosed clinically without microscopy.
      - Significant tuberculin reaction or recent conversion in children.
      - Pulmonary disease with negative sputum smears with cultures that are positive, pending or not done.

   c. Priority Three:

      - Extra pulmonary disease only if there is evidence of aerosolization at the site of disease.

B. Ensure Prompt, Accurate Intake Data and Assessment

1. Establish an intake/assessment process at the health department that accommodates intake regarding infectious tuberculosis.

2. Ensure that all staff who take phone calls and are "on-call" are familiar with what information to gather and how to alert the proper health department staff if an active or suspect case is reported both during and after normal health department hours.

3. Prioritize and implement the investigation based upon the priorities in Section A. 4. and 5., **and** the clinical urgency of the individual case and situation.

4. Arrange for any indicated acute care needs or for the necessary medical examinations, chest x-rays or medical evaluations/diagnoses of the index case if not already done.

5. Arrange for isolation/respiratory precautions or confinement of the index case if needed. [*Refer to the health department policies and procedures for Isolation Preparedness and Implementation and Confinement Preparedness and Implementation for guidance.*]

6. Arrange for the home visit, including any necessary use of interpreters, and prepare in advance to interact with the identified person and family with cultural sensitivity. [*Local Health Departments may establish minimum time frames for investigations if desired; statutory requirement is not prescriptive,* ***health officer remains responsible***.]

Conducting Comprehensive Contact and Source Case Investigations

7. Use appropriate infection control practices and personal protective equipment for visits to persons with infectious *M. tuberculosis*. [*Refer to Health Department policies procedures and practices related to M. tuberculosis Control.*]

8. Initiate or arrange for case management follow-up for the index case at the initial visit if not yet established.

C. Documentation

1. Collect and document comprehensive data about the index case or suspect promptly and systematically according to clinical record policies, procedures and forms of the health department including the following minimum information:

    a) Full name and any other names used
    b) Date of birth
    c) Locating information; addresses used, telephone numbers, next of kin names and phone numbers, and emergency contact names and phone numbers
    d) Tuberculosis disease site and infectious status
    e) Dates/sources and bacteriological results for acid fast bacilli and culture
    f) Chest x-ray results including the extent of the disease (cavitary/noncavitary)
    g) Dated PPD results in millimeters and significance per risk factors
    h) Clinical signs and symptoms (presence of cough, productive/nonproductive, onset and duration of cough, etc.)
    i) Anti-tuberculosis drug regimen including dosages, date initiated and evaluate for compliance (i.e. is person receiving DOT?)
    j) Previous history of any TB disease or infection and treatment history
    k) Any other medical, mental, or psychosocial conditions (HIV, substance abuse, mental illness, malnutrition, poverty, etc.)
    l) Any language/cultural/psychosocial factors of which you should be aware prior to your visit to the client/family

2. Ensure confidentiality of all information collected. [*Follow health department policies, procedures and practices for ensuring confidentiality.*]

D. Initiating the Contact or Source Case Investigation

1. Conduct the initial interview face to face at the home of the index case. If a visit and interview with the person occurs prior to the home interview, for instance at a hospital, the home interview/assessment is still required for a contact or source case investigation.

*[Local standards for time frames for the initial interview may be inserted here if the local health department chooses. A time frame is not prescribed in the WI Statutes or Administrative Code; the health officer remains responsible for contact investigations to be conducted **at once** when infectious*

disease is known or suspected. [WI Stats. ss. 252.06(3)] *The goals of the Strategic Plan for the Elimination of TB in Wisconsin call for the interview to be within three days of confirmation. If more urgent action is clinically indicated, the local health department is expected to act accordingly.*]

2. Use interpreters when indicated and incorporate sensitivity to cultural and psychosocial needs and differences for all investigation activities and written materials.

3. Determine period and degree of infectiousness and assess potential for transmission for that period. Estimate periods of time based upon onset of symptoms for persons evaluated during your investigation, especially during a source case investigation since the person factors will not be evident until the infectious case is identified.

4. Identify and prioritize contacts for investigation. See sections G. and H. below.

5. Look for environmental clues that will lead you to contacts (i.e., pictures, toys, etc.)

6. Arrange for the prompt medical evaluation and chest x-ray of all symptomatic contacts and provide or arrange for sputum specimen collection.

7. Assess, evaluate and initiate skin testing for all Close Contacts and High-Risk Contacts and assess for signs and symptoms of active disease.

8. Identify specific environments where the index case may have transmitted TB or where the contact may have been exposed to a source case and plan further investigation for those environments.

9. Educate the index case about:

    a. The importance of adherence to the prescribed medications, providing initial or continuing medication teaching according to client need,

    b. Prognosis and potential for a positive outcome with completion of treatment,

    c. How TB is spread & how he/she can reduce this spread,

    d. The importance and urgency of identifying and evaluating contacts, and

    e. How to confidentially and easily report any additional contacts; provide the case and family with phone numbers and information on how to access the health department.

10. Identify any immediate barriers to adherence and provide the education and/or incentives needed to promote treatment adherence for this individual. [*Use or develop health department policies, procedures, and practices for Case Management and Directly Observed Therapy.*]

Conducting Comprehensive Contact and Source Case Investigations

11. Establish rapport and open communication with the index case and family to ensure further reporting of contacts that are remembered later.

12. Identify sources of other health or medical care needed and make appropriate referrals/appointments for any other identified or suspected health issues.

13. Follow health department policies, procedures and practices for case management and continuing care.

E. Assessment of Contacts

1. Determine the named contacts who shared air with the index case during the infectious period, systematically covering all environments: home/household/shelter, work/school/volunteer and social/leisure.

2. Prioritize contacts, identify their environments and vulnerability factors and identify any potential contacts for whom information is incomplete and provide or arrange for further follow up.

3. Use the concentric circle approach and document in an organized, retrievable format. [*See sample forms or utilize your own documentation tools.*]

4. Assess both frequency, closeness and duration of exposure and determine for which persons the time, duration, environmental or risk factors created the likelihood of transmission in each exposure environment.

5. Determine if each person named as a contact meets the definition of a TB contact, i.e., Close Contact, High-Risk Contact or Other Than Close Contact. Document testing of worried or "just in case" non-contacts as "non-contacts".

6. Evaluate the environments of the index case and all contacts for transmission factors related to crowding, ventilation, exposure, infectiousness, etc.

7. Verify and document contact's names, nicknames, ages or estimated ages, addresses, locating/demographic information and description, if needed, on contact investigation documentation tools. [*See sample forms or utilize your own documentation tools.*]

8. **Re-interview the index case several times to ensure that accurate and complete contact information is obtained.** [*At the initial interview, the index case may feel ill, be anxious, not remember well, not trust the interviewer yet, be worried about health, confidentiality, etc.*]

F. Evaluation of Index Case; Person, Time and Place Factors

- Infectiousness and infection period of the index case can narrow the time frame for both contact and source case investigations as it identifies the

emergence of symptoms so the likely time fame for transmission can be more closely approximated.
- Closeness of the exposure
- Frequency and time factors of exposure
- Characteristics of the environment

1. Assess the **Person** factors:

   a. Assess the **infectiousness** of the index case, evaluating **laboratory** data using the criteria in the table below; Sputum Smear, Translation of Infectiousness:

Sputum Smear, Translation of Infectiousness*	
If lab reports:	**Patient is:**
None, no AFB seen, negative	Potentially infectious ++
Rare, 1+, 1-9 AFB/100 oil immersion fields	Possibly infectious
Few, 2+, 1-9 AFB/10 oil immersion fields	Probably infectious
Moderate, 3+, 1-9 AFB/oil immersion fields	Probably infectious
Numerous, many, 4+, >9 AFB/oil immersion fields	Probably very infectious

++ 100,000 organisms per milliliter of sputum are necessary for a positive smear result. A person with pulmonary tuberculosis and negative smears could potentially be infectious, but is less likely to be infectious than persons with positive smears.

[*Adapted by The WI TB Program from information in Tuberculosis Nursing: A Guide to Patient Care, p. 87]

*A positive AFB smear is not conclusive for M. tuberculosis; it simply means that there are mycobacteria in the specimen. Further testing is needed to identify whether they are **tuberculosis** mycobacteria, or **non-**tuberculosis mycobacteria.*

   b. Relate available culture reports to the smear status of the *same* specimens. See table below, Sample Bacteriology Reports. [*For example: if the patient has been on medication and the cultures are negative, the AFB is either not present or dead (and will not grow on culture.) Thus the possibility of infectiousness is decreased.*]

Sample Bacteriology Reports*		
Smear Results	**Culture Results**	**Means the AFB are:**
Rare	Negative	Dead
Few	Negative	Dead
Numerous	Negative	Dead
Rare	Positive	Alive
Few	Positive	Alive
Numerous	Positive	Alive

[* Tuberculosis Nursing: A Comprehensive Guide to Patient Care, p. 89]

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c. Assess the **infectiousness** of the index case, evaluating **clinical** data and all other available information. Use the factors listed and the table below for assessing higher or lower risk of transmission.

- The **presence of a cough.** Coughing and producing a lot of sputum as well as singing, talking, and sneezing greatly increases the possibility of transmission.
- The **duration of the symptoms.** Prolonged duration of respiratory symptoms increases the likelihood that transmission has taken place.
- The **presence of laryngeal TB.** Laryngeal TB is usually very contagious and increases the risk of transmission.
- The **presence of cavitary disease** on the chest x-ray report. Cavitary disease is more contagious than non-cavitary disease.
- **Positive smear** of the index case increases likelihood of transmission
- Check if the index case **spontaneously produced the specimen** as this would indicate an increased likelihood of transmission than if the specimen had to be induced or obtained by bronchscopy
- Evaluate **anti-tuberculosis therapy** taken by the index case. If the index case has been compliant for two or more weeks with medications to which his/her TB organisms are sensitive, the numbers of AFB should have decreased significantly.

Person Factors*	HIGHER risk of transmission	LOWER risk of transmission
Symptoms	**Cough**	No cough
Symptom Duration	**Prolonged Cough**	Brief duration
Disease Location	**Laryngeal/Pulmonary**	Extrapulmonary alone
Chest x-ray	**Cavitary disease**	Non-cavitary disease
Smear status	**Positive**	Negative
Smear source	**Spontaneous specimen**	Induced or bronchoscopy-obtained
Receiving treatment	**No treatment or recently began treatment**	Effective treatment underway for two weeks or more prior to contact's exposure

[*Adapted by The WI TB Program from information in Tuberculosis Nursing, p. 87-89]

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2. Assess the **Time Factors** that determine the transmission of TB.

   a. Determine the **period of infection** based upon the history given by the index case or contacts, relating primarily to when they first began to notice symptoms. The following table on determining the likely infectious period may be used:

Determining likelihood of infectious period:*				
Index Case Characteristics:				
TB Symptoms Absent	TB Symptoms Present	AFB Smear Negative	AFB Smear Positive	**Recommended *minimum* beginning of Likely period of infectiousness++**
✓		✓		Eight weeks prior to date of 1st positive finding consistent with TB
	✓	✓		10 weeks prior to symptom onset, or ten weeks prior to date of 1st positive finding consistent with TB
✓			✓	12 weeks prior to 1st positive finding consistent with TB
	✓		✓	10 weeks prior to onset or 12 weeks prior to 1st positive finding consistent with TB – whichever is longer ago

++Positive findings consistent with TB include, but are not limited to the following: specimen that shows a positive AFB, positive amplification test for *M. tb*, positive *M. tb* culture, chest x-ray showing abnormality consistent with TB or the initiation of antibiotic treatment for TB.

[**Source: Contact Investigation Guidelines jointly developed by the California Department of Health Services and the California Tuberculosis Controllers Association.*]

1. Assess for **Place** or **Environmental factors** that determine the transmission of TB in all of the environments of the index case. The environmental factors will be most significant in your search for a source case as the person factors will not be known until the source is found. The table below, Likelihood of Disease Transmission, may assist you with your judgements.

   a. Assess for:

   - Circulation of air
   - Length of time in the environment
   - Size of the airspace
   - Location of the index case and each contact in the air space

LIKELIHOOD OF DISEASE TRANSMISSION*		
Factor	**HIGHER**	**Lower**
Volume of air common to the Case/Contacts	**Small**	Large
Adequacy of Ventilation	**Poor**	Good
Recirculated Air	**Yes**	No
Upper UV Light	**Not present**	Present

[*Adapted by the WI TB Program from information in Tuberculosis Nursing: A Comprehensive Guide to Patient Care, p. 89]

b. Make a field visit to the work site or social settings of the index case and/or other sites where he/she spent considerable time to assess for transmission.

c. Evaluate the adequacy of ventilation at all sites, e.g., presence (and type) or absence of air conditioning, whether or not air is circulated or filtered, number of windows and doors and whether open or closed, presence of window fans with or without outside exhaust.

d. Identify and evaluate any additional contacts not previously named during field investigation visits by questioning employers and others as indicated.

6. Protect confidentiality and avoid confirmation of the identity of the case.

G. Evaluation of Contacts, Risk Factors

1. Assess for factors that place a contact at a higher risk for TB disease or infection. The presence of any of these factors increases the level of concern for transmission to a level similar to the Close Contact.

*For example, an adult **contact** with a healthy immune system who is **not** a **Close** Contact is of a lesser concern than a Close Contact. In addition, any individual with any of the risk factors listed below who has the same type of exposure as this healthy adult **is at a priority similar to the close contacts.***

2. Immediately arrange for physician evaluation of **any** ill or symptomatic contacts regardless of type of contact or index case characteristics.

3. Consider persons with any of the conditions below as High-Risk Contacts. Assign the first two, children and persons who are HIV +, the highest priority:

   a. **Infants or children 4 years of age or younger**
   b. **HIV positive persons**
   c. Persons who have had organ transplants and other immunosuppressed persons receiving the equivalent of $\geq$ 15 mg/day of prednisone for 1 month or more
   d. Persons who are known to already have fibrotic changes on chest x-ray consistent with prior TB
   e. Injection drug user
   f. Persons with the following clinical conditions:
   - Silicosis
   - Diabetes Mellitus
   - Chronic Renal Failure
   - Some hematologic disorders (e.g., leukemias and lymphomas)
   - Other specific malignancies (e.g., carcinoma of the head, neck, lung or upper gastrointestinal tract)
   - Weight 10% or more below ideal body weight
   - Conditions leading to malabsorption syndrome/undernutrition, such as gastrectomy, jejunoileal bypass, chronic peptic ulcer disease, chronic alcoholism

4. Consider contacts who fit into population risk factors (refugees, immigrants, etc.) as having the same significance for ***transmission from the index case*** as contacts who are not part of a high-risk population. Consider the persons with **medical/immunity risk factors** as more vulnerable to transmission.

5. Recognize the potential for some positive skin tests related to the overall TB infection rate for a high risk population when your investigation involves such a population. This impact on investigation skin test results needs careful analysis.

H. Prioritizing with the Concentric Circle

1. Prioritize Close Contacts, High-Risk Contacts and other Contacts for the contact or source case investigation using the concentric circle approach for all environments beginning with the immediate household contacts.

2. Evaluate and skin test identified contacts in a logical and efficient order.

3. Use all the person, time, environmental and high-risk factors.

4. Determine each person who is a contact to the index case, and the number of contacts based upon your assessments, testing and analysis.

5. Evaluate all factors related to the contact including frequency, duration, circumstances, closeness of exposure, etc., and make a judgement about the exposure level.

6. Assign a numerical exposure level identification that is consistent with your judgement based upon your assessment/analysis of all factors.
[*Use this grid or develop your own evaluation/documentation tools.*]

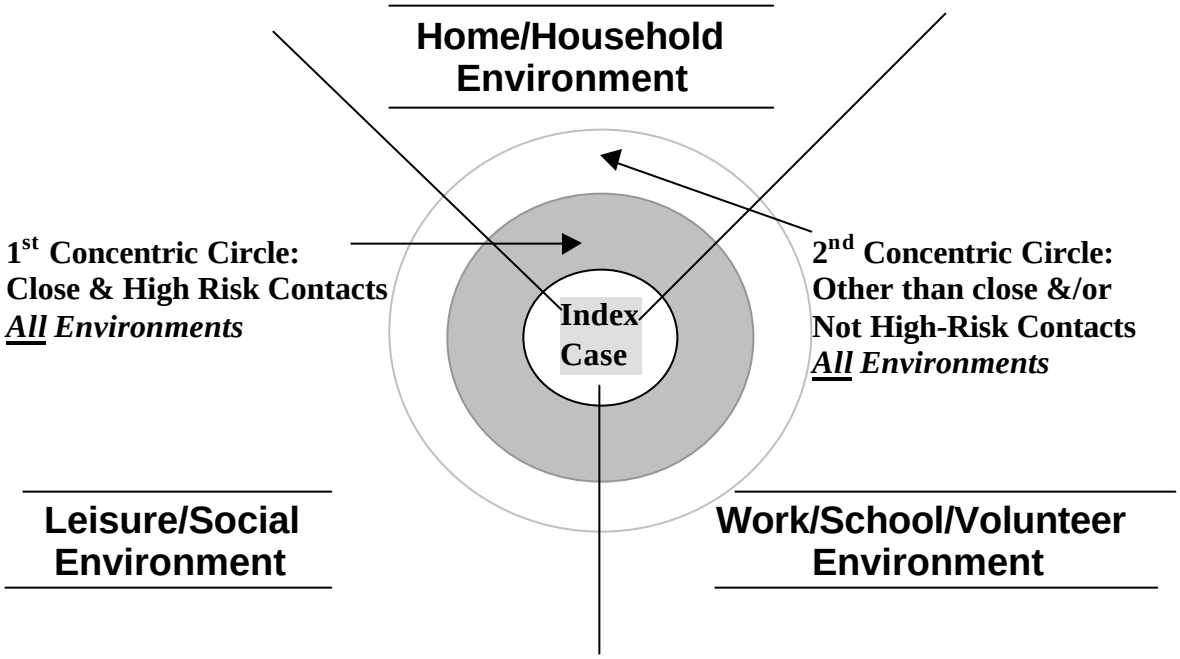
Exposure Level I.D.*	Level terminology	Descriptors/notes
3	**Very high**	**Continuous, indoor contact**
2	**High**	**Regular and long term contact**
1	Moderate	Regular, but short contact, or infrequent but long (e.g. one weekend)
0	Minimal	

[**Table adapted from material developed by the Madison Department of Public Health, Madison, WI*]

7. Document each person and the investigation data and retain for analysis and reporting. [*See sample documentation tools and forms or use your own.*]

Conducting Comprehensive Contact and Source Case Investigations

Concentric Circle



8. Initiate TB skin testing and any indicated medical evaluations of the **inner circle of close contacts and high-risk contacts in all environments**.

    a. Test **children** and those who are **HIV positive** as the highest priority.

The goals of the Strategic Plan for the elimination of TB in Wisconsin call for the skin testing and medical evaluation of contacts who are children (4 years of age and younger) or are immunosuppressed to be completed no later than 10 days after they have been identified as contacts. Clinical judgement prevails if greater urgency is indicated.

    b. Follow health department policies, procedures and practices for the proper application and reading of skin tests and the education of the person being tested.

    c. Follow health department policies, procedures and practices for protecting privacy and confidentiality.

    d. Refer contacts who reside or move out of the jurisdiction of the health department to the appropriate health department directly on your own or obtain the assistance of the state TB Program if needed.

Conducting Comprehensive Contact and Source Case Investigations

9. Apply the following *additional* criteria for skin testing in a contact or source case investigation:

    a. Contacts with a positive skin test who are discovered to have active disease are started on active disease treatment and a new contact investigation is begun for those individuals.

    b. Contacts with a positive skin test for whom active disease is ruled out should be medically evaluated and treatment for LTBI should be implemented and completed unless contraindicated.

    c. Contacts with a history of previous treatment who are age four and under, immunocompromised or HIV positive should receive a chest x-ray and a medical evaluation, but not a TST, to evaluate them for potential re-infection and re-treatment.

    d. Contacts with a documented prior positive TST should have a chest x-ray and medical evaluation but do not need a TST.

    e. Contacts with history of BCG should be tested and read without regard to the BCG history.

10. Refer all contacts promptly for a **chest x-ray and medical evaluation regardless of their skin test results** if any of the following are present:

    - **Signs or symptoms** of TB
    - **Evidence** of clinical **disease**
    - **HIV infected** or other **immunosuppressed** conditions
    - Children **four** years of age **or younger**
    - **Any high-risk** candidates who should receive window period prophylaxis until the 90 day post exposure evaluation

11. Interview each contact for medical history and the contact's description of their tuberculosis exposure while maintaining confidentiality of the index case and by not *confirming* index case identity or revealing any medical information of any other person.

12. Collect or arrange for sputum specimen collection from contacts with pulmonary symptoms using infection control principles, health department infection control policies, procedures and practices and the appropriate personal protective equipment. [*Refer to health department policies, procedures or practices for sputum specimen collection.*]

13. Educate each contact regarding the:

    a. Facts of the exposure to a person with infectious tuberculosis while maintaining the privacy and confidentiality of the index case and any other contacts,

b. Difference between infection and disease; providing answers to their questions and concerns and provide appropriate written educational material.

c. Importance of returning for skin test reading within 48-72 hours, and

d. Signs and symptoms of active disease that they should watch for and report.

Whenever a source case or any other new case of active disease is identified during an investigation, that person becomes a new index case and a new contact investigation is done for that case.

I. Initial Testing and Evaluation of Contacts

1. Obtain chest x-rays and a medical evaluation for **all** persons with newly identified positive **(³ 5 mm)** and previously documented positive skin test results.

2. Obtain chest x-rays of the close or high-risk contacts with initial negative skin test results (less than **5 mm**) **if**:

   a. The contact exhibits any signs and symptoms of disease or if there is other evidence of clinical disease,

   b. The contact is a child four years or younger, or is immunosuppressed (e.g., infected with HIV),

   c. Any factors suggest a **high probability** of infection,

   d. Other contacts with a similar degree of exposure demonstrate a **high prevalence** of infection,

   e. The contact is going to be started on window prophylaxis because the physician has decided it is indicated (e.g., an adolescent whose physician has made this determination),

3. Obtain a chest x-ray and medical evaluation for a **contact** with a **documented** history of a prior positive TST. Consider this person a candidate for treatment for LTBI unless there is **confirmation** that adequate therapy was completed. This is a medical determination; potential re-infection must be considered.

It is not entirely clear that once the body has recognized the TB organism that in every instance the immune system will mount a sufficient response to once again fight the TB. Immunity is possible, but it is not guaranteed. Persons who have previously been treated for TB infection or disease should be considered as having some potential for re-infection and be evaluated accordingly. Evidence of immune suppression may indicate a need for treatment.

4. Obtain a chest x-ray and medical evaluation for a contact with a history of previous treatment who is HIV +, age four or under or immunosuppessed. Arrange for this medical determination promptly as the potential for re-infection is greater in a previously treated person who is HIV +, young or immunosuppressed than in the person with a healthy immune system who has been previously treated.

5. Obtain medical evaluations and orders for treatment according to the following skin test result criteria:

   a. Contacts with **positive skin tests (≥5mm) during the first round of tests**.

   b. **Children four years of age and under** – initiate and complete window period prophylaxis and re-evaluate TB skin test results 90 days post exposure.

   c. **Children five years and older** are placed on window period prophylaxis at the physician's discretion.

*Treatment of children and adolescents is highly specialized and should be accompanied by consultation with a physician experienced in this area. The reference book **Red Book 2000** by the American Academy of Pediatrics serves as a guideline – see reference list.*

   d. **HIV positive individuals** are placed on window period prophylaxis.

   e. Persons with unknown HIV status who are at risk for HIV infection are referred for HIV testing and counseling.

J. Decision-making regarding contacts

1. Consult the Wisconsin Tuberculosis Program if assistance is needed for epidemiologic analysis or discussion about the estimated infection rate in the community of the investigation.

2. Calculate the rate of positive skin tests among the inner circle of Close and High-Risk Contacts according to the following formula:
   [*See instructions for the Concentric Circle Analysis worksheet.*]

   a. Divide the number of contacts with newly positive skin tests by the
   b. Number of *contacts* tested in each environment (exclude non-contacts) and
   c. Multiply this number by 100 to obtain a rate in percent.

3. Compare the rate of contacts with newly identified positive skin tests to the estimated rate expected in the community of the investigation.

A community within a community (such as a jail in a city, or a factory that employees a majority of persons who are born outside the United States) should be evaluated based upon data and judgements about both environments.

4. If the percentage of newly positive skin test reactions in the inner circle of contacts is greater than expected in the community of the investigation, expand to the next circle of contacts.

5. Consult the TB Program on the extent of infection/disease found after completing the initial skin testing on close contacts and high-risk contacts regarding the decision on proceeding to the next level of contacts. Do not dilute the denominator of your calculation by including persons tested who met the definition of non-contacts.

6. Continue with the concentric circle process, expanding to the next circle of contacts in household, work, or leisure settings and analyze results on an ongoing basis.

7. Expand to the next circle of contacts when the rate of infection exceeds the rate expected for that community of persons.

8. **Stop** the investigation when a circle of contacts is found to **have no more infection than is expected for the community of the investigation**. The WI TB Program can assist you in comparing this data.

K. 90 Day Post Exposure Testing

1. Calculate the 90 day post exposure date for each contact based upon your analysis of the infectious period of the index case and the exposure dates of the contact. [*See Sections D., E. and F. of procedure if review needed.*]

2. **Retest all contacts who were initially skin test negative at 90 days post exposure unless the following criteria are met:**

   - At the time of the **initial** test, 90 days **had already passed** from the time the contact had their last exposure to the index case while that person was infectious.

   - Adapt the following table for use in your health department to assist with decision-making if it would be helpful, or develop your own tool:

90 day post exposure testing for contacts who were negative at initial test:	
If last contact with case was 90 days *before* the initial skin test	✓Consider that the "initial" test is also the 90 day post exposure test
If *last* contact with case was *less than* 90 days before the initial skin test	✓Retest 90 days after date of *last date of contact* with the case
If the contact continued to share air with the case **while** the case was still infectious	✓Retest 90 days after last date the contact shared air with the case while the case was considered infectious. [Determine infectious period of the case accurately before setting this date.]
Note: A person who shared air *outside* the infectious period would not meet the definition of a contact and ordinarily would not receive an initial test or a 90 day test.)	

[**Adapted by the WI TB Program from materials developed by the California Department of Health Services and the California Tuberculosis Controllers Association*]

L. Documentation and Submission to the WI TB Program

1. Document findings of the investigation in concise format so that all examinations completed may be analyzed efficiently. [*See sample forms or use your own.*]

2. Record and retain all original investigation data in the clinical record of the TB index case for analysis, epidemiological, surveillance and reporting purposes.

3. Submit a copy of the contact information data to the WI TB program after the initial testing and clinical evaluation of all close and high-risk contacts. This is due 30 days after the case has been identified.

4. Submit a copy of the updated 90-day post exposure investigation information four months after the case has been identified.

M. Health Department Responsibilities for Investigations done by other providers

1. Monitor and document contact and source case investigations done by or involving other providers to ensure that complete and accurate data are obtained and reported and that all rules, regulations and guidelines are followed.

2. Document an investigation completed by another health department or other provider in the case record of your health department if you are the *reporting* health department.

The local health department is ultimately responsible for ensuring accurate contact identification and management for all tuberculosis within their jurisdiction regardless of who does a particular investigation - physician's office, clinic, tribal health care, hospital, employee health department, nursing home, etc.

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3. Provide consultation and technical assistance to other providers to ensure that all investigations in your jurisdiction meet all laws, codes and the best practice standards of public health for appropriate contact identification and management.

4. Verify that the entire PPD skin testing and reading procedure is correct, educate staff as indicated and assist with the skin testing and reading as necessary to provide for quality outcomes.

5. Assist in the accurate identification and analysis of contacts as necessary. (e.g., The facility's policy may be to test the entire facility population, however, findings documented in the index case's clinical record for health department surveillance purposes need only contain findings for the persons who meet the definitions of contacts identified by the concentric circle investigation.)

6. Continue with the investigation as indicated by the analysis of the inner circle of contacts. If the inner circle contacts (e.g., roommates, high-risk contacts, etc.) are found to have no more infection than is expected for the community being investigated, the public health department involvement is complete.

7. Provide examples of documentation forms and additional education as needed to all providers within your jurisdiction who need to know how to implement or participate in contact and source case investigations.

8. Document in your own records or obtain and retain copies of investigation documentation necessary to document public health oversight and assistance and to ensure the protection of the health of the public.

9. Analyze positive skin test reactions from nursing homes and long-term care facilities to ensure that boosted reactions are not classified as conversions or are unrelated to the index case and provide education as indicated.

10. Ensure that medical evaluation and treatment is initiated according to CDC recommendations.

11. Ensure 90 day post exposure skin testing. Reevaluate the need to do further testing based on infection rate.

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12. Ensure that investigations done in other health departments or by other providers meet the following criteria:

    a. Compilation and retention of all contact information for all contacts of the index case in the public health record

    b. Submission of a copy of the contact investigation information to the WI TB Program according to the following parameters:

        - First round investigation data 30 days after case or suspect identification
        - Second round investigation data four months after case or suspect identification

        [*Sample forms are included or you may submit your own forms with the identical information or submit electronically when available.*]

    c. Establishment and maintenance of lines of communication with persons in other agencies or providers who are responsible for the contact investigation and provision of technical assistance as needed.

    d. Assistance of the Wisconsin TB Program is obtained, if needed, when the health department is out of state.

    e. Transference of medical record information with confidentiality protections as necessary to support the investigation and protect the health of the public.

    f. Analysis and documentation of findings in the index case's clinical record.

    g. Appropriate consultation with, and reporting to, the Wisconsin Tuberculosis Program regarding index case, contacts and the investigation.

N. **Preliminary Quality Analysis, Health Department and other Providers**

1. Analyze the contact or source case investigation data and the concentric circle data, summarize and document

2. Determine that the testing and analysis is sufficiently complete and accurate to serve as a basis for decision-making and follow up. Analysis should include summary of:

    a. Index case

    b. Investigation of environments (home, work, leisure)

c. Collective results of **contact's** exams

d. Identification and, when indicated, evaluation of the source case.

e. Identification, number, and percentage of:

- Newly positive skin test reactors
- Contacts with abnormal chest x-rays, suspects, or new cases
- Patients placed on window period prophylaxis
- Patients placed on treatment for LTBI

3. Determine if the contact or source case investigation appears complete for index case and all contacts

4. Correct any oversights and follow-up with any missing contacts or incomplete data and evaluate for the basic components, especially:

   a. Index case was interviewed at home more than once and a number of contacts were identified and tested, no contacts were missed.
   b. Infectiousness and likely period of infection of index case were accurately determined.
   c. Appropriate chest x-rays, medical evaluations and sputum collections were completed
   d. Contacts needing evaluation had complete evaluations

   e. Contacts were appropriately placed on window prophylaxis, treatment for LTBI or treatment for active disease.

5. Identify and correct any weaknesses in the investigation or issues that need urgent follow up.

6. Develop and implement plans for education and improvement based upon over all analysis, following health department policies, procedures and practices for quality assurance.

O. **90 Day Post exposure analysis**

1. Review Section K. regarding accurate setting of time frames for post exposure skin testing while gathering investigation data.

2. Analyze the 90 day post exposure skin test results on all close contacts and high-risk contacts to the index case who had a non-significant TST for first round testing.

Conducting comprehensive contact and source case investigations

3. Determine now if there is a need to expand the investigation to another level of contacts that was not indicated from the analysis of first round testing.

4. Expand into the next circle of contacts if the incidence of newly positive skin tests exceeds the incidence in the community of the investigation.

5. End the investigation if the rate of newly positive skin tests at the 90 day post-exposure evaluation still does not exceed the incidence in the community of the investigation.

6. Submit a copy of the updated contact investigation information for the 90 day post exposure skin testing to the Wisconsin TB Program 4 months after the case was identified. [*Use model forms or submit your own forms with identical information.*]

V. References for State Guideline Development

[*The following references were used to develop the model state guideline. Any additional references used by the local health department should also be listed in the final policy and procedure document.*]

1. American Academy of Pediatrics. **Red Book 2000, Report of the committee on Infectious Disease**, 25th Edition, 2000

2. American Thoracic Society. **Diagnostic Standards and Classification of Tuberculosis in Adults and Children.** April, 2000

3. American Thoracic Society. **Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection**. April, 2000

4. California Department of Health Services and Executive Committee of the California Tuberculosis Controllers Association. **Guidelines for the Placement or Return of Tuberculosis Patients into High Risk Housing, Work, Correctional, or In-Patient Settings**. 1997.

5. California Department of Health Services and Executive Committee of the California Tuberculosis Controllers Association. **Contact Investigation Guidelines 11/12/98**

6. Centers for Disease Control and Prevention. **Core Curriculum on Tuberculosis**; Fourth Edition, 2000.

7. Centers for Disease Control and Prevention. **Improving Patient Adherence to Tuberculosis Treatment**. 1994.

8. National Tuberculosis Controllers Association. **Tuberculosis Nursing: A Comprehensive Guide to Patient Care**, 1997.

9. New Jersey Medical School National Tuberculosis Center, **Tuberculosis Glossary**, 1995

10. North Carolina Division of Epidemiology, Department of Health and Human Services. **North Carolina Tuberculosis Policy Manual**. 1997.

11. Wisconsin Department of Health and Family Services. **Wisconsin Administrative Rule, Control of Communicable Diseases,** Chapter 145.

12. Wisconsin Division of Public Health. **Infection Control Plan for Local Health Departments** (developed as a template for local health departments). 1998.

13. Wisconsin Division of Public Health. **Tuberculosis Infection Control Plan** (developed as a template for county jails). 1998.

14. **Wisconsin Statutes, Communicable Diseases**; ss. 252.06 – 252.07; 1997-98.

15. **Wisconsin TB Program Strategic Plan for Elimination of TB in Wisconsin,** 2001.

16. **World Wide Web addresses**, National Model TB Centers & CDC:

    Harlem Model Center – www.harlemtbcenter.org
    New Jersey Model Center – www.umdnj.edu/ntbc
    San Francisco Model Center – www.nationaltbcenter.edu
    Centers for Disease Control and Prevention, CDC, Atlanta – www.cdc.gov

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The following section of the guideline contains information, forms and resources that can be adapted for use and training by local health departments. All information and forms in this guideline are within the public domain and may be photocopied and distributed.

Tips for Interviewing

Primary objectives

1. Assess the index case, especially regarding symptomatology, infectious period, and contacts
2. Determine all environments of the index case where transmission may have occurred
3. Identify contacts and obtain information on how and where to locate all contacts
4. Assess the education needs of each interviewee and provide the necessary education
5. Maintain confidentiality of all information
6. Build trust and confidence with all interviewees and families and promote adherence to treatment

Basic positive interview techniques

1. Establish rapport, arrange for privacy and put the interviewee at ease
2. Create an atmosphere free of distractions and interruptions
3. Listen attentively; be objective and avoid emotional reactions
4. Demonstrate self-confidence regarding tuberculosis and public health
5. Maintain cultural sensitivity in all actions and interactions.
6. Demonstrate awareness and caring regarding psychosocial and spiritual needs.
7. Ask questions one at a time and wait for a response; most clients relay information more slowly than health care workers would prefer
8. Resist the urge to go on to another question before getting the answer you need, or be sure to make it clear to the person that you will return to the question later.
9. Use positive questions to encourage a positive response
10. Avoid negative questions to avoid negative responses
11. Use open-ended questions to promote a response that contains more information

Introduction

1. Break the ice with brief, comfortable dialog.
2. Demonstrate warmth, caring and sincerity.
3. Define purpose, establish working relationship, and secure cooperation.
4. Provide reassurance that confidentiality is maintained and explain how this is done if necessary.
5. Convey that you have the knowledge and skills to help the individual and family through every contingency that may develop.

Information giving and receiving

1. Identify and resolve the person’s concerns first and foremost.
2. Correct myths, educate about the disease and transmission.
3. Reinforce the importance of adherence to treatment, assess compliance and implement measures necessary to promote adherence to treatment.
4. Begin with the most familiar contact information – close contacts – and move outward slowly.
5. Elicit names, phone numbers and any other needed identifying information for each contact.
6. Cover each environment comprehensively, allowing the person to return to a previous environment when contact is remembered that was not identified earlier; remain flexible.
7. Document information completely as you go for accuracy while still maintaining rapport with the person.

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Conclusion

1. Conclude the interview when the objectives have been met. If time becomes strained, end the interview when it is no longer going to be productive and reschedule the next interview for as soon as possible. Be sure you have fully addressed the measures needed to protect the health of the public before leaving the home of an index case.
2. Summarize the information you have gathered and instruct the person in what will happen next, including how confidentiality will be maintained.
3. Answer any unanswered questions and provide information on how to contact public health if the person remembers a contact or an environment between now and the next interview appointment.
4. Express appreciation for the person's cooperation and information and help them to feel positive about their opportunity to protect others.
5. Re-assess motivation for adherence; implement any needed incentives that may not be in place.
6. Educate about the positive prognosis when effective treatment is taken to completion.

Follow up

1. Arrange for return visits and re-interview.
2. It takes more than one interview to ensure the accurate and complete contact information is obtained.

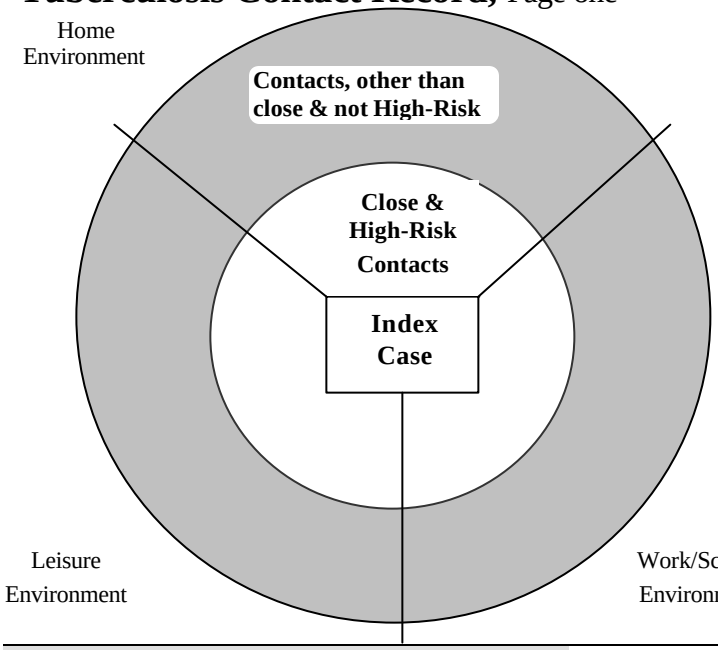
Questioning Suggestions:

Questions	**Suggestions for Better Questions**
How many people do you live with?	Who has lived with you in the past six months?
How much time do you spend in your apartment?	When not in your apartment, where do you go?
What's your job title?	Tell me what you do at work?
Are you a substance (drugs/alcohol) abuser?	When is the last time you used drugs or alcohol?
Do you have a cough?	When did you start coughing?
Do you have visitors come to your home/apartment?	Tell me who visits you at your home/apt?
Do you visit with anyone?	Tell me about some of your hobbies/activities?
Do you have any friends/family?	Who are your friends/family?

Ask questions about the recent past in increments, being sure to include the holidays that are significant in the culture of the person, the family and their environment:

1. Who visited you from out of town 1 month ago; 2 months ago, etc?
2. Did anyone else live with you within the past month; 2 months; etc?
3. Whose children do you keep after school; on weekends; etc?
4. Who have you visited in the past month; two months?
5. Where did you work 2 months ago?

Tuberculosis Contact Record, Page one



Index Case Information:

Name _____

State Case Number _____

DOB __/__/____

Address _____

_____

Site of tuberculosis disease _____

Probable Infectious Period Dates _____

Other significant information _____

_____

CONTACT:

Name _____
Address _____
_____

Date of birth _____

Ph # _____ ❑ Male ❑ Female

Race/Origin
❑ U.S. Born
❑ Born outside USA
❑ White
❑ Black
❑ Hispanic
❑ Am. Ind. or AL Nat.
❑ Asian Pac. Isl.

Exposure Environment:
❑ Home/Household/Shelter
❑ Work/School/Volunteer
❑ Leisure/Social

Last Exposure - __/__/__

or Likely Period of Exposure - __/__/__ to __/__/__

Skin Test Results

Dates	Results	Significance
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.

X-Ray Results

__/__/__ _____
__/__/__ _____
__/__/__ _____

Type of Contact
❑ Close
❑ High Risk
❑ Other than close &/or Not High Risk
❑ Non-Contact, tested

Exposure Level I.D.
❑ **3 – Very High**
❑ **2 – High**
❑ 1 – Moderate
❑ 0 – Minimal

Medical Evaluation

Date done __/__/___

Physician	Phone #
_____	_____
_____	_____

❑ **Evaluation Complete**

❑ No *Medical* Evaluation indicated

Results/Actions:
❑ LTBI treatment
❑ Window prophylaxis
❑ TB disease, new investigation

Date medications began _____
❑ State supplied medications
Other_____
_____
_____
_____

CONTACT:

Name _____
Address _____
_____

Date of birth _____

Ph # _____ ❑ Male ❑ Female

Race/Origin
❑ U.S. Born
❑ Born outside USA
❑ White
❑ Black
❑ Hispanic
❑ Am. Ind. or AL Nat.
❑ Asian Pac. Isl.

Exposure Environment:
❑ Home/Household/Shelter
❑ Work/School/Volunteer
❑ Leisure/Social

Last Exposure - __/__/__

or Likely Period of Exposure - __/__/__ to __/__/__

Skin Test Results

Dates	Results	Significance
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.

X-Ray Results

__/__/__ _____
__/__/__ _____
__/__/__ _____

Type of Contact
❑ Close
❑ High Risk
❑ Other than close &/or Not High Risk
❑ Non-Contact, tested

Exposure Level I.D.
❑ **3 – Very High**
❑ **2 – High**
❑ 1 – Moderate
❑ 0 – Minimal

Medical Evaluation

Date done __/__/___

Physician	Phone #
_____	_____
_____	_____

❑ **Evaluation Complete**

❑ No *Medical* Evaluation indicated

Results/Actions:
❑ LTBI treatment
❑ Window prophylaxis
❑ TB disease, new investigation

Date treatment began _____
❑ State supplied medications
Other_____
_____
_____
_____

TB Contact Record, Page ____ of ____ **Index Case Name _____ DOB _____**

CONTACT:

Name _____
Address _____
_____
Date of birth _____
Ph # _____ ❑ Male ❑ Female

Race/Origin
❑ U.S. Born
❑ Born outside USA
❑ White
❑ Black
❑ Hispanic
❑ Am. Ind. or AL Nat.
❑ Asian Pac. Isl.

Exposure Environment:
❑ Home/Household/Shelter
❑ Work/School/Volunteer
❑ Leisure/Social

Last Exposure - __/__/__

or Likely Period of Exposure - __/__/__ to __/__/__

Skin Test Results

Dates	Results	Significance
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.

X-Ray Results

__/__/__ _____
__/__/__ _____
__/__/__ _____

Type of Contact
❑ Close
❑ High Risk
❑ Other than close &/or Not High Risk
❑ Non-Contact, tested

Exposure Level I.D.
❑ **3 – Very High**
❑ **2 – High**
❑ 1 – Moderate
❑ 0 – Minimal

Medical Evaluation

Date done __/__/___
Physician _____ Phone # _____

❑ **Evaluation Complete**

❑ No *Medical* Evaluation indicated
Results/Actions:
❑ LTBI treatment
❑ Window prophylaxis
❑ TB disease, new investigation
Date medications began _____
❑ State supplied medications
Other_____
_____
_____
_____

CONTACT:

Name _____
Address _____
_____
Date of birth _____
Ph # _____ ❑ Male ❑ Female

Race/Origin
❑ U.S. Born
❑ Born outside USA
❑ White
❑ Black
❑ Hispanic
❑ Am. Ind. or AL Nat.
❑ Asian Pac. Isl.

Exposure Environment:
❑ Home/Household/Shelter
❑ Work/School/Volunteer
❑ Leisure/Social

Last Exposure - __/__/__

or Likely Period of Exposure - __/__/__ to __/__/__

Skin Test Results

Dates	Results	Significance
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.

X-Ray Results

__/__/__ _____
__/__/__ _____
__/__/__ _____

Type of Contact
❑ Close
❑ High Risk
❑ Other than close &/or Not High Risk
❑ Non-Contact, tested

Exposure Level I.D.
❑ **3 – Very High**
❑ **2 – High**
❑ 1 – Moderate
❑ 0 – Minimal

Medical Evaluation

Date done __/__/___
Physician _____ Phone # _____

❑ **Evaluation Complete**

❑ No *Medical* Evaluation indicated
Results/Actions:
❑ LTBI treatment
❑ Window prophylaxis
❑ TB disease, new investigation
Date treatment began _____
❑ State supplied medications
Other_____
_____
_____
_____

CONTACT:

Name _____
Address _____
_____
Date of birth _____
Ph # _____ ❑ Male ❑ Female

Race/Origin
❑ U.S. Born
❑ Born outside USA
❑ White
❑ Black
❑ Hispanic
❑ Am. Ind. or AL Nat.
❑ Asian Pac. Isl.

Exposure Environment:
❑ Home/Household/Shelter
❑ Work/School/Volunteer
❑ Leisure/Social

Last Exposure - __/__/__

or Likely Period of Exposure - __/__/__ to __/__/__

Skin Test Results

Dates	Results	Significance
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.
__/__/__	___mm	Pos. Neg.

X-Ray Results

__/__/__ _____
__/__/__ _____
__/__/__ _____

Type of Contact
❑ Close
❑ High Risk
❑ Other than close &/or Not High Risk
❑ Non-Contact, tested

Exposure Level I.D.
❑ **3 – Very High**
❑ **2 – High**
❑ 1 – Moderate
❑ 0 – Minimal

Medical Evaluation

Date done __/__/___
Physician _____ Phone # _____

❑ **Evaluation Complete**

❑ No *Medical* Evaluation indicated
Results/Actions:
❑ LTBI treatment
❑ Window prophylaxis
❑ TB disease, new investigation
Date medications began _____
❑ State supplied medications
Other_____
_____
_____
_____

TUBERCULOSIS CONTACT RECORD - INSTRUCTIONS

1. Submit a copy of these forms, or forms containing similar information to the Wisconsin TB Program

   - **30 days** after identification of the suspect or case, **and**
   - an updated copy of the results of the 90-day post-exposure follow up **four months** after identification of the case.

2. Enter all identifying information of the case or suspect in the upper right hand corner on the first page. On subsequent pages, add sufficient information to ensure that all contacts remain linked to the correct index case, minimally index case name. Use DOB or TB case number as necessary, especially for names that are easily confused.

3. For each contact, assess and document the following data:

   a. **Name, address, date of birth, phone number, gender**

   b. **Race/Origin**

      - U.S. Born or Born outside the USA
      - Race of contact [White (non-Hispanic), Black, Hispanic, American Indian/Alaskan Native, Asian/Pacific Islander]

   c. **Exposure Environment** Choose the environment in which the contact shared air with the index case, referring to the concentric circle.

   d. **Last Exposure Date** Document the last exposure date if relevant to this contact, e.g., the index case lived with the contact for a month when the case first arrived in this country, but they have had no further contact since this date. Assess and document this information for future follow-up, especially when you calculate the 90-day post exposure follow-up date. See Sections K. and O. of procedure.

   e. **Likely Period of Exposure** Document likely period of exposure for comparison of period of exposure of the contact and the infectious period of the case – important for establishing 90-day post exposure dates.

   f. **Type of Contact** - Refer to the definitions of each element for accuracy and to sections G. and H. of the procedure for decision-making regarding contacts, close contacts and non-contacts and apply sound clinical judgement.

   g. **Consider the categories or types of defined contacts:** Transmission is affected by factors such as the time spent sharing air, the environmental conditions and other factors, such as the vulnerability of the contact. All Close and High-Risk contacts are also part of the broader classification of "contacts". A "contact" may also be a person who has shared air with a person with infectious TB, but not to the extent that they are considered Close Contacts or High-Risk Contacts.

      - **Contact –** A person who shares air with a person who has infectious TB.

      - **Close Contact –** An individual who has shared air with a person with infectious TB and is at high risk of developing infection with *M. tuberculosis* because of the length, time or frequency of their exposure; **close, prolonged contact**.

      - **High-Risk Contact** – A contact in any environment who is at increased risk of progression from TB infection to TB disease and/or is likely to suffer increased morbidity or mortality from TB disease

because of his/her vulnerability, even if the length of time or circumstances of the exposure are not judged to meet the criteria of "close".

For example, a young child or a person who is HIV+ is at risk of *transmission* because of the vulnerability of the immune system even though their contact may have been less than "close and prolonged". A person from a country where TB is endemic may already have a positive skin test due to a TB infection from their home country. However, unless they have compromised immunity for some reason, they have no more risk of having had TB *transmitted* to them *from the index case* than a person born in the USA. You might be accustomed to referring to them as "high-risk", but their "endemic country of origin" risk factor is related to their increased risk of *having* infection or disease, it does not necessarily mean that they are more vulnerable to *transmission*.

- **"Other Than Close" Contact –** An individual with less intense or less frequent contact to the index patient than the close contacts, causing them to be at less risk of developing infection with *M. tuberculosis* because of less time and intensity of exposure to the index case. All contacts have risk; the greater risk is for Close Contacts and High-Risk Contacts.

- **Previously Infected Contact –** A person who has previously tested positive for TB infection who is now a contact of a person with active tuberculosis.

- **Non-contact –** A person who has probably not shared air with the index case but is named or tested during the contact investigation, usually due to request; a worried person who was probably not exposed. These persons, who really are *not* judged to be contacts, should *not* be included in analyses, calculations, aggregate reports or reviews.

h. **Exposure Level Identification –** See section F. of the procedure. This "pulls all together" your clinical judgement based upon all the exposure factors into a "level of concern" to guide prioritization & decisions. **Level 3 and Level 2** get the most prompt attention; no contact is ignored. Persons with a type of exposure that would typically be in a particular category *who are also high-risk due to immunosuppression* can be "bumped up" one level according to your judgement about the potential for *transmission* from the index case. **For example**, persons who are High-Risk due to immunosuppression may be "bumped" from Moderate to High if you would ordinarily group their exposure/contact in the "moderate" level of concern, but they are **a young child or are HIV+**. Persons are not necessarily at greater risk of *transmission* from an index case because of their country of origin. Even if they are more likely to be skin test positive, perhaps due to a higher background rate of infection in their country, it may not be related to their exposure.

  - ID **Level 3** – **Very High** - Continuous indoor contact – highest priority contacts, very highly likely that TB could have been *transmitted* from the index case.

  - ID **Level 2** – **High** – Regular and long term contact – Those persons who had contacts that were not continuous, but were frequent enough or over a long enough period when the index case was infectious that the chance of *transmission* from the index case was high.

  - ID Level 1 – Moderate – Regular, but short length of time for the contact, or infrequent but for a longer period of time, such as one weekend

  - ID Level 0 – Minimal contact – Contact occurred but it was short, infrequent and not regular. If they are a young child or HIV +, these persons could move to level One according to your judgement.

  - Non-contacts who are tested do *not* meet level zero for contacts; they are *non-contacts.*

i. **Skin Test Results** – Document mm of induration and significance **for this contact**., dates placed, etc.

j. **X-Ray Results** – Date and document the actual medical findings. A normal chest x-ray should be recorded as normal, negative, or no active disease seen. If the chest x-ray is abnormal for TB, then a report should be attached and the TB Program notified of that individual as a case or suspect. Additional studies or tests are indicated for an abnormal chest x-ray in a tuberculosis contact.

k. **Medical Evaluation** – Date done and physician reference for follow-up (optional data elements for your convenience if you want physician information handy.)

l. **Evaluation Complete** – Check this ***after*** the person has been evaluated sufficiently to determine whether they have latent TB infection or TB disease. Key points:

- For persons who only need a TST for evaluation, their evaluation is not complete until the TST is read. For most contacts, this would be only after their 90 day post-exposure TST unless their initial TST is given 90 days after their last exposure. See procedure, Section K.

- For persons who have a positive TST, their evaluation is *not* complete until active disease has been excluded.

- For persons who are placed on window period prophylaxis, their evaluation is not complete until the 90-day post exposure evaluation determination if they have infection or disease.

- If persons are previously positive and not given a skin test, their evaluation is only complete after they have had a chest x-ray and a medical evaluation that eliminates active disease.

- If no medical evaluation is indicated, you may document your judgement here, i.e., they test negative, have no symptoms, etc.

m. **Results/Actions** –

- If the contact is begun on LTBI treatment, document.
- If the contact is begun on window prophylaxis, document
- If the **contact** is diagnosed with TB **disease**, document that a new investigation is being done for that person as an index case.

n. **Date medications began** --

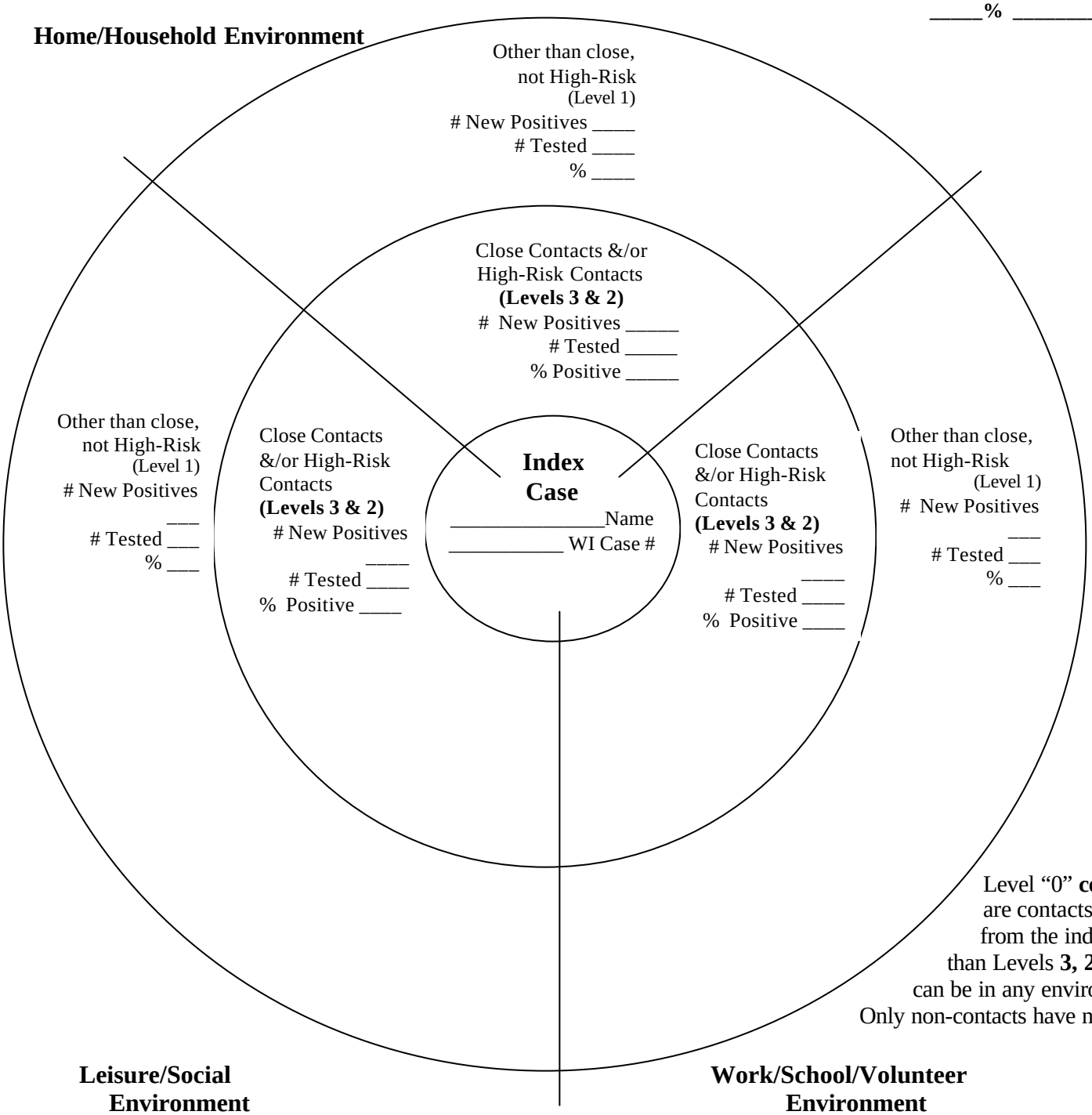
- Include date therapy was initiated for anyone placed on medications and

- Document whether the medication is state supplied. A check means it is state supplied, if not checked, the client is getting the medications from another source.

o. **Other** – Document any other needed information. If a person is a contact to more than one case, write DUPLICATE CONTACT here. Other information can be here or in a clinical record.

Concentric Circle Analysis:

Investigation Community Incidence
_____% _____
_____% _____



Level "0" **contacts** are contacts further from the index case than Levels **3, 2** or 1 & can be in any environment. Only non-contacts have no level.

Comments/Analysis Summary – See Contact data grids:

CONTACT DATA ANALYSIS:

INNER CIRCLE CONTACTS – LEVELS 3 & 2	HOME	WORK	LEISURE
a. Number of contacts named			
b. Number of contacts **identified** (meet definition)			
c. Number of contacts identified **at levels 3 & 2**			
d. Number of contacts **skin tested**			
e. Number of contacts with **newly positive TST**			
f. Percentage rate [e. ÷ d. x 100]			
g. Number who were previously positive			
h. Number **completing evaluation**			
Comments:			

SECOND CIRCLE CONTACTS – LEVELS 1 & 0	HOME	WORK	LEISURE
a. Number of contacts named			
b. Number of contacts **identified** (meet definition)			
c. Number of contacts identified **at levels 1 & 0**			
d. Number of contacts **skin tested**			
e. Number of contacts with **newly positive TST**			
f. Percentage rate [e. ÷ d. x 100]			
g. Number who were previously positive			
h. Number **completing evaluation**			
Comments:			

_____ CIRCLE CONTACTS – LEVELS __ & __	HOME	WORK	LEISURE
a. Number of contacts named			
b. Number of contacts **identified** (meet definition)			
c. Number of contacts identified **at levels** _____			
d. Number of contacts **skin tested**			
e. Number of contacts with **newly positive TST**			
f. Percentage rate [e. ÷ d. x 100]			
g. Number who were previously positive			
h. Number **completing evaluation**			
Comments:			

Concentric Circle Analysis Instructions

1. Consult the WI Tuberculosis Program to discuss the estimated TB infection rate in the community in which you are conducting the investigation and document in the upper right hand corner before doing your data analysis. There is no single rate for expected level of infection. Rates for comparison are estimates based on groups with similar demographics.

2. Determine as you proceed with the investigation, that each named contact meets one of the definitions for a contact. Transmission is affected by factors such as the time spent sharing air, the environmental conditions and other factors, such as the vulnerability of the contact. All Close Contacts and High-Risk contacts are also part of the broader classification of "contacts". A "contact" may also be a person who has shared air with a person with infectious TB, but not to the extent that they are considered Close Contacts or High-Risk Contacts

   Categories of Contacts:

   - **Contact –** A person who shares air with a person who has infectious TB.

   - **Close Contact –** An individual who has shared air with a person with infectious TB and is at high risk of developing infection with M. tuberculosis because of the length, time or frequency of their exposure; close, prolonged contact.

   - **High-Risk Contact –** A contact in any environment who is at increased risk of progression from TB infection to TB disease and/or is likely to suffer increased morbidity or mortality from TB disease because of his/her vulnerability, even if the length of time or circumstances of the exposure are not judged to meet the criteria of "close".

   - **"Other Than Close" Contact –** An individual with less intense or less frequent contact to the index patient than the close contacts, causing them to be at less risk of developing infection with M. tuberculosis because of less time and intensity of exposure. All contacts have risk; the greater risk is for Close Contacts and High-Risk Contacts.

   - **Previously Infected Contact** – A person who has previously tested positive for TB infection who is now a contact of a person with active tuberculosis.

   - **Non-contact** – A person who has probably not shared air with the index case but is tested during the contact investigation, usually due to request; a worried person who was probably not exposed and should be excluded from analysis.

3. Using the Concentric Circle Analysis worksheet and the Contact Data Analysis worksheet grids, count and calculate the rates of infection in all circles and all environments and compare to the expected rate in the community:

   The contacts named during the investigation are recorded on the TB Contact Records, one section per contact as described in the instructions for completion of those worksheets. In each of these sections, the judgement about exposure level and has been assigned a numerical exposure level ID. (3 – Very High, 2 – High, 1 – Moderate, & 0 – Minimal)

   a. On the grid for the inner circle of contacts, record the number of contacts named (optional data for your use).
   b. Record the actual number of contacts that are contacts *by definition*.

c. For the inner circle, identify and count the number of identified contacts that are at level three and level two, the priority people for evaluation and skin testing

d. Record the actual number of level three and level two contacts skin tested for inner circle testing. Goal is to test and count all of the contacts that were not previously positive.

e. Record the number of **newly positive** contacts from this skin testing.

f. Calculate the percentage by dividing the number of newly positive skin tests in the inner circle by the number of skin tests administered to *contacts* in the inner circle and multiplying by 100. For example:

# of contacts with newly positive skin tests **X 100**
Total # of *contacts tested*

Example # 1: Ten contacts were identified in this circle. 10

Two contacts were previously positive (no *new* skin test) -2
Eight = total contacts skin tested (denominator) **8**
Four = newly positive skin tests (numerator) **4**

Four newly positive skin tests **4** X 100
Eight total contacts skin tested **8** **Rate = 50%** for the inner circle

Note: Do not delay moving outward while waiting to test every last person in the inner circle if there are **any** factors that signal you to have a higher level of concern about *transmission*. For example, the index case is grossly smear positive and a new active disease case is identified among the close contacts.

4. Calculate the percentage rate in the inner circle of each environment using the same formula. Significant new transmission to contacts in the first circle of **any** environment warrants moving to the next concentric circle in that environment.

Example # 2:

In the work environment 62 persons were identified as close or high-risk contacts of the index case. Twelve of them were previously documented by employee health as having positive TB skin tests and they have previously received nine months of INH treatment for infection.

62 minus 12 = 50

Fifty skin tests are placed and read. **Ten** of them are positive.

# of newly positive skin test contacts **10** **= .20 X 100 = 20%**
Total # of contacts *tested* **50**

5. Compare this rate to the expected rate in the community. Determine if the rate exceeds the community rate. If it does, expand into the next circle of contacts, levels 1 and 0 in the environment exceeding the expected rate.

6. Continue testing in expanding circles in each environment until the community rate is not exceeded.

7. Document and analyze each environment in expanding concentric circles using the same process.

Summary of Process:

1. Complete these steps first for the inner circle then expand as needed.

    a. Interview index case for named contacts
    b. Identify/count the number of named contacts that ***are contacts by definition.***
    c. Determine the contacts that are priorities (Levels 3 & 2), testing them and those who are at high risk of *transmission* as a priority.
    d. Record the number of inner circle contacts skin tested. Goal is to test and count all of the *contacts* that were not previously positive. [Follow procedure for how to evaluate those who were previously positive. They are not in the newly infected rate calculation. Record them and ensure a complete valuation even though a skin test is not appropriate.]
    e. Count all of the inner circle (Level 3 & 2) contacts who are **newly positive** ($\geq$ 5 mm).
    f. Divide the number of newly positive inner circle contacts by the number of inner circle contacts tested. (e. divided by d.) Multiply by 100 for percentage. This is the figure you use to analyze how the group you are testing compares to the community of the investigation, deciding how far to expand your investigation.
    g. Compare the investigation result (f.) with the incidence obtained from the TB program for the community of the investigation.
    h. Continue testing in expanding circles in each environment until the community rate is not exceeded.

3. Document data and analysis in each expanding circle until investigation completed.

4. Record the number of identified contacts who previously tested positive for tuberculosis infection and ensure that their evaluation is completed even though you do not do a TST. [Document that the individual's evaluation is complete on their section of the TB Contact Record.]

5. Record the number of contacts **completing evaluation.** This is the **total** number of contacts evaluated added together – those you skin test **and** those who previously tested positive that were **evaluated** without a TST.

6. Investigation is complete when each contact has had a complete evaluation and the rate of infection does not exceed the rate of TB in the community of the investigation.

Conducting Comprehensive Contact and Source Case Investigations

Supplement One – 4/02 *This supplement provides information in addition to the original guideline.*

Sample - Contact Examination Order

(Suggested language, may place on health department stationery. Note: Information in this format is not appropriate for persons who do not speak or read English and/or have impaired literacy skills. It must be translated or interpreted and explained in a language and in a way that they understand.)

To: (Individual's Name, Address and Date of Birth)

You have been exposed to infectious tuberculosis, and there is a risk that you could become infected with the bacteria that causes the disease. Because of your exposure, a Mantoux tuberculin skin test should be administered as soon as possible. The result of the skin test will determine the need for a more extensive medical evaluation, including a chest x-ray or other medical tests.

In accordance with HFS 145.10(12), I, _____, *(Local Health Officer)* Health Officer for _____*(City/County)* Health Department, order you to receive a Mantoux tuberculin skin test free of charge as arranged by _____. Call_____(*contact name)* at _____ (*phone number)* to make arrangements to receive this test or with any questions you have about this order.

Violation of this order could result in further legal action.

_____ Date ____/____/____
Health Officer Signature Month/Day/Year

Signature acknowledges receipt of the original order:

_____ Date ____/____/____
Client's Signature Month/Day/Year

Witness to service of order:

_____ Date ____/____/____
Witness Signature Month/Day/Year

Served by: _____ Date ___/____/____
Signature Month/Day/Year

Circle one: a.) Health Officer form b.) Client form